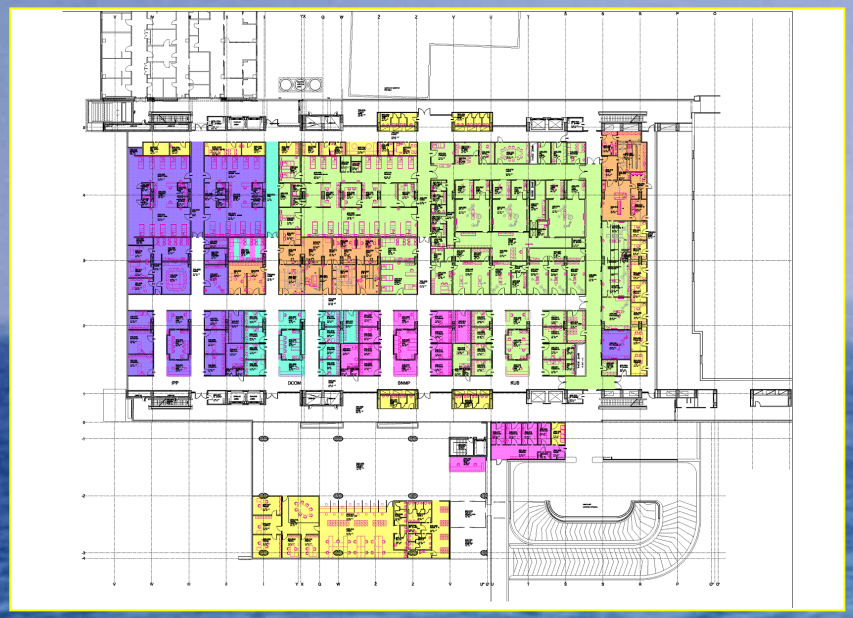
CMAS inštruktorski licenčni seminar, Ljubljana 2010

Procesi v človeškem organizmu pri potopih globlje od 35m ter njihove posledice

Asist. mag. Hugon Možina, dr. med.
Interistična prva pomoč, UKCLjubljana
Zdravniška komisija pri Slovenski potapljaški zvezi


NaCl
200



HBO v Ljubljani

- 1992 - 95 manjša hiperbarična komora v okviru MF
- v maju 2005 večja večprostorska hiperbarična komora na MF v Ljubljani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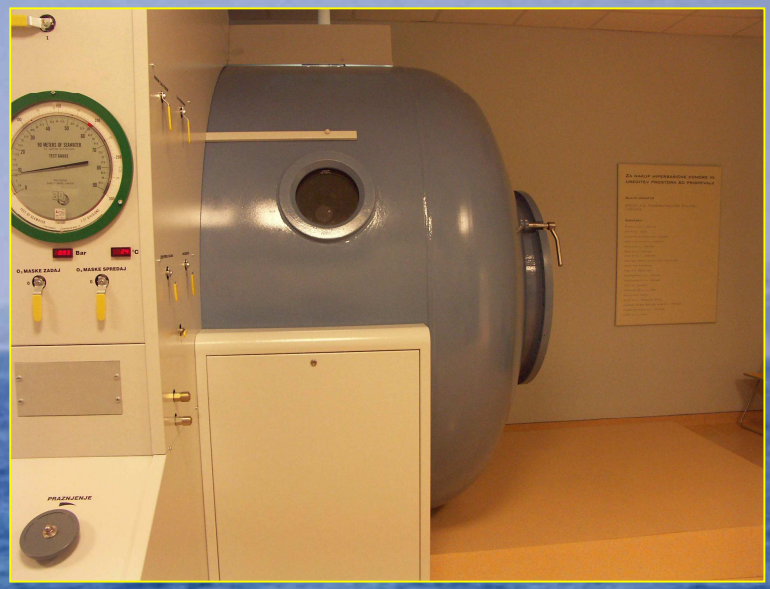
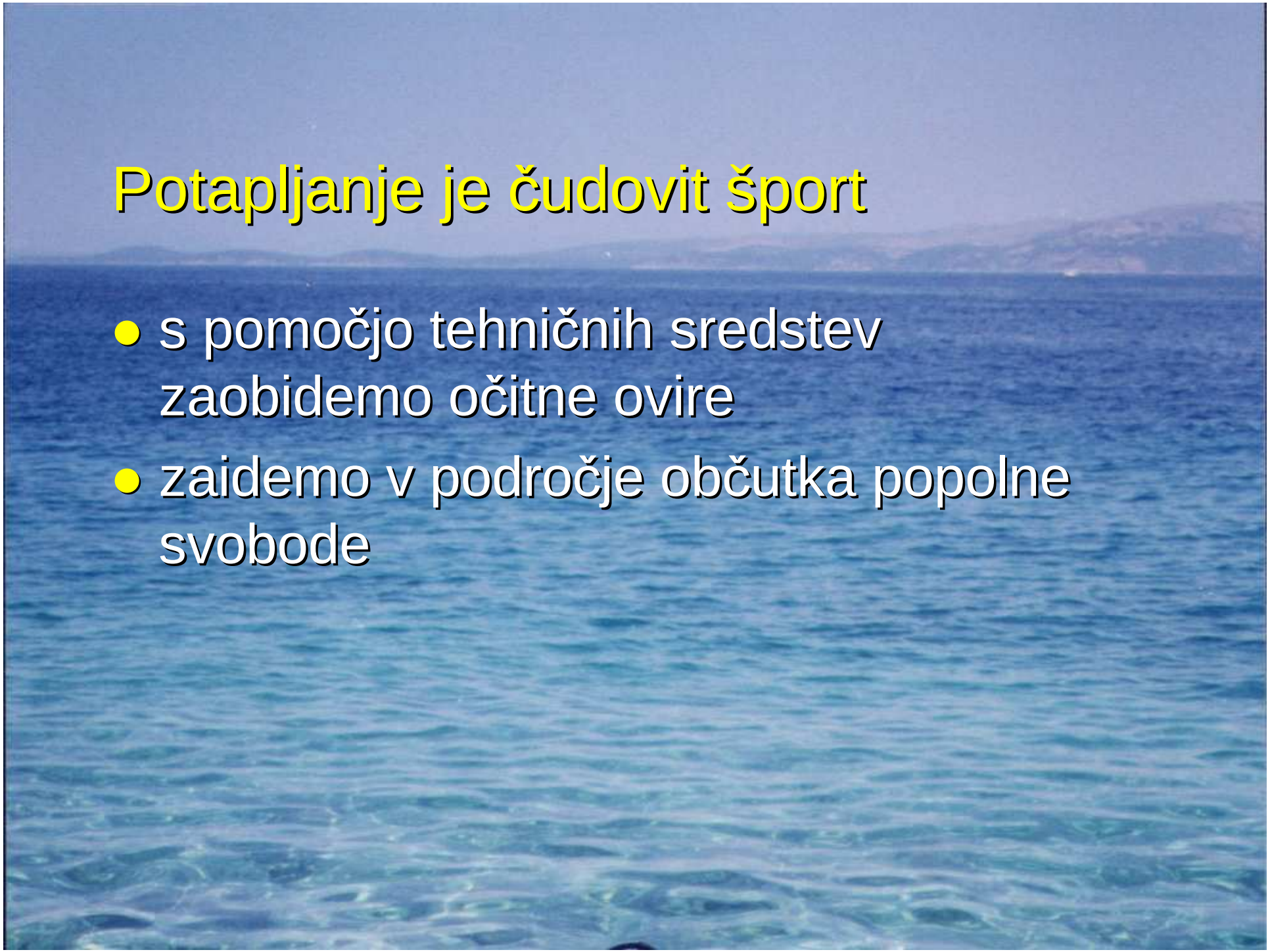


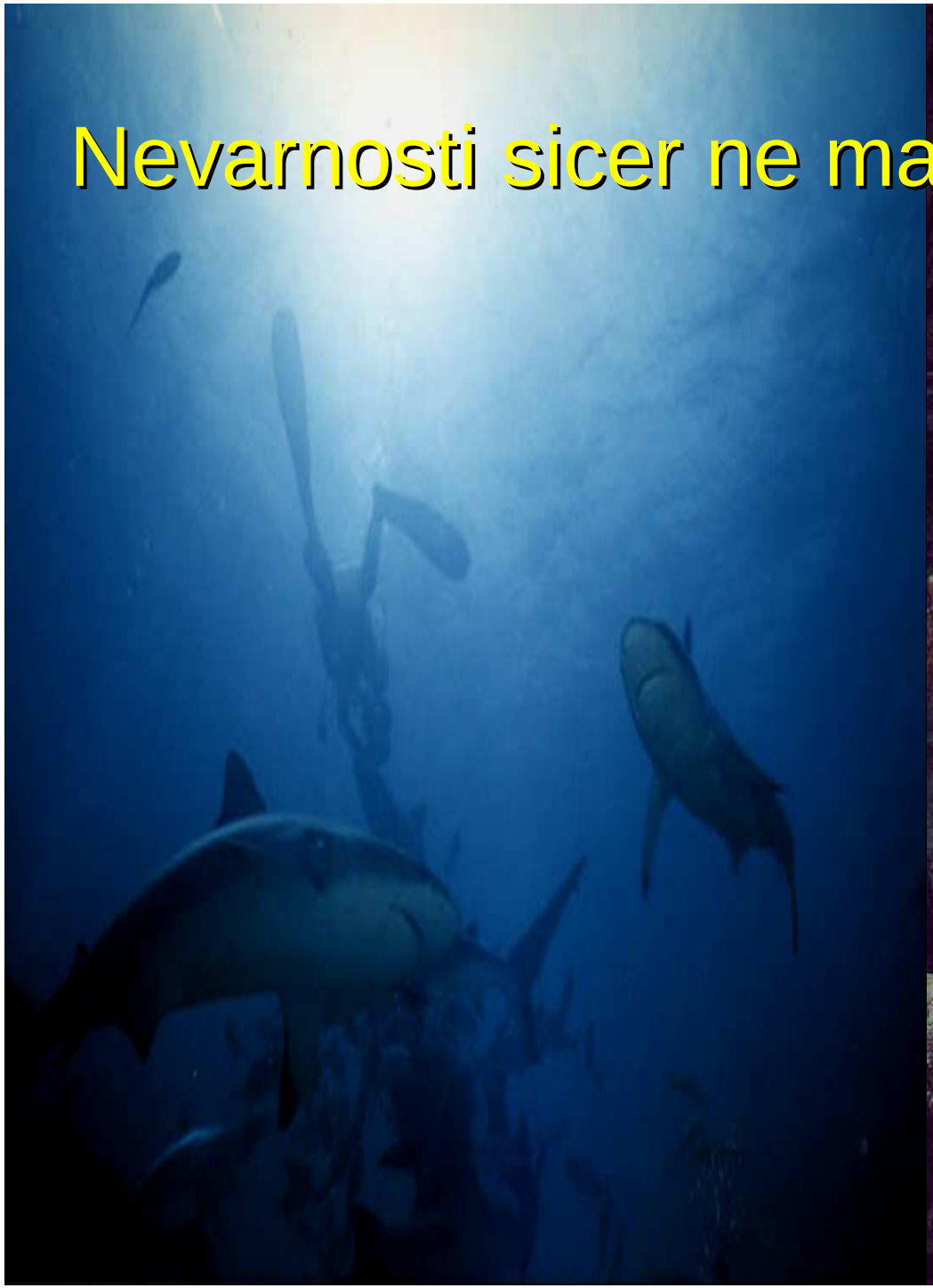
Protokol 3 ATA 90 minut

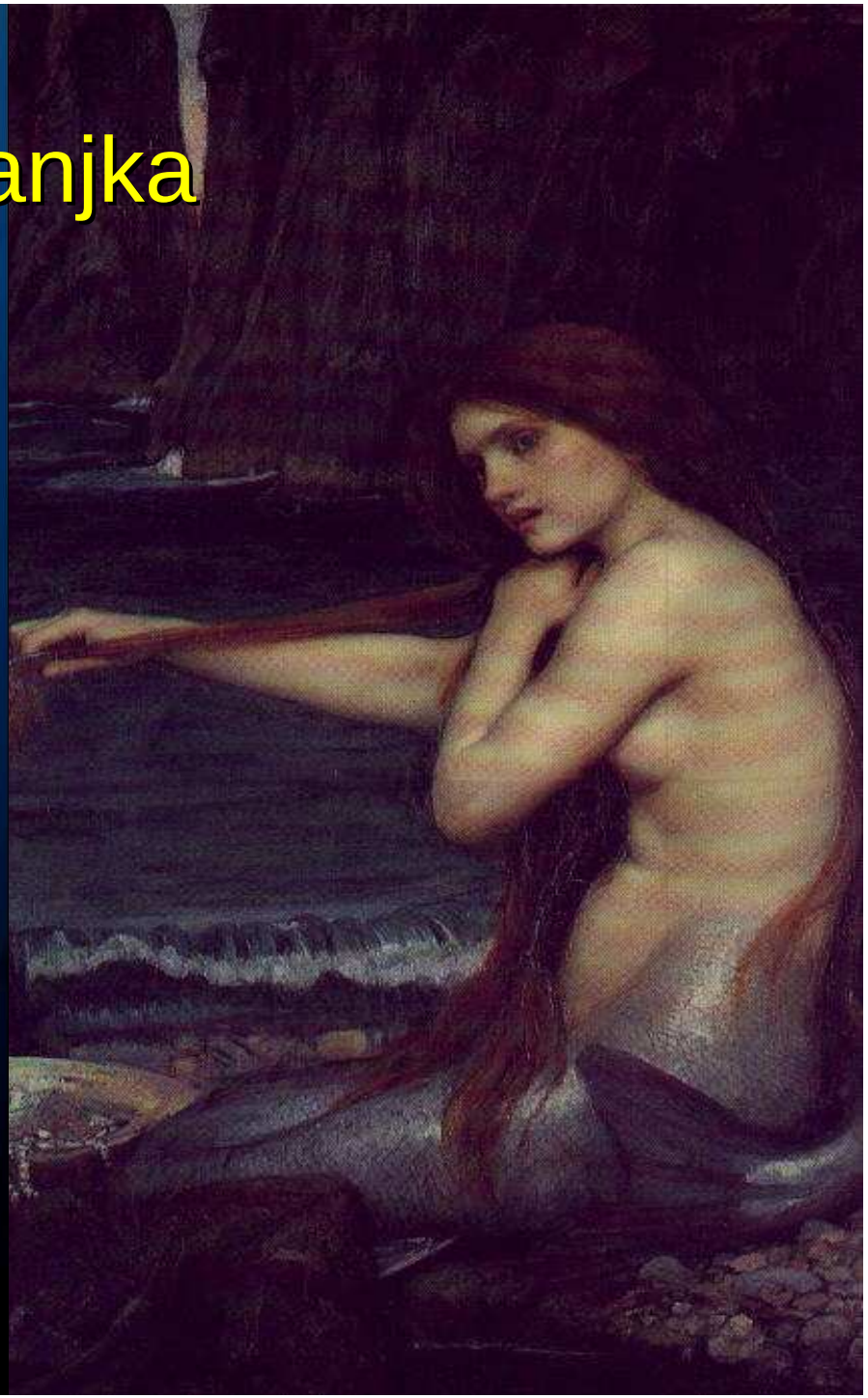


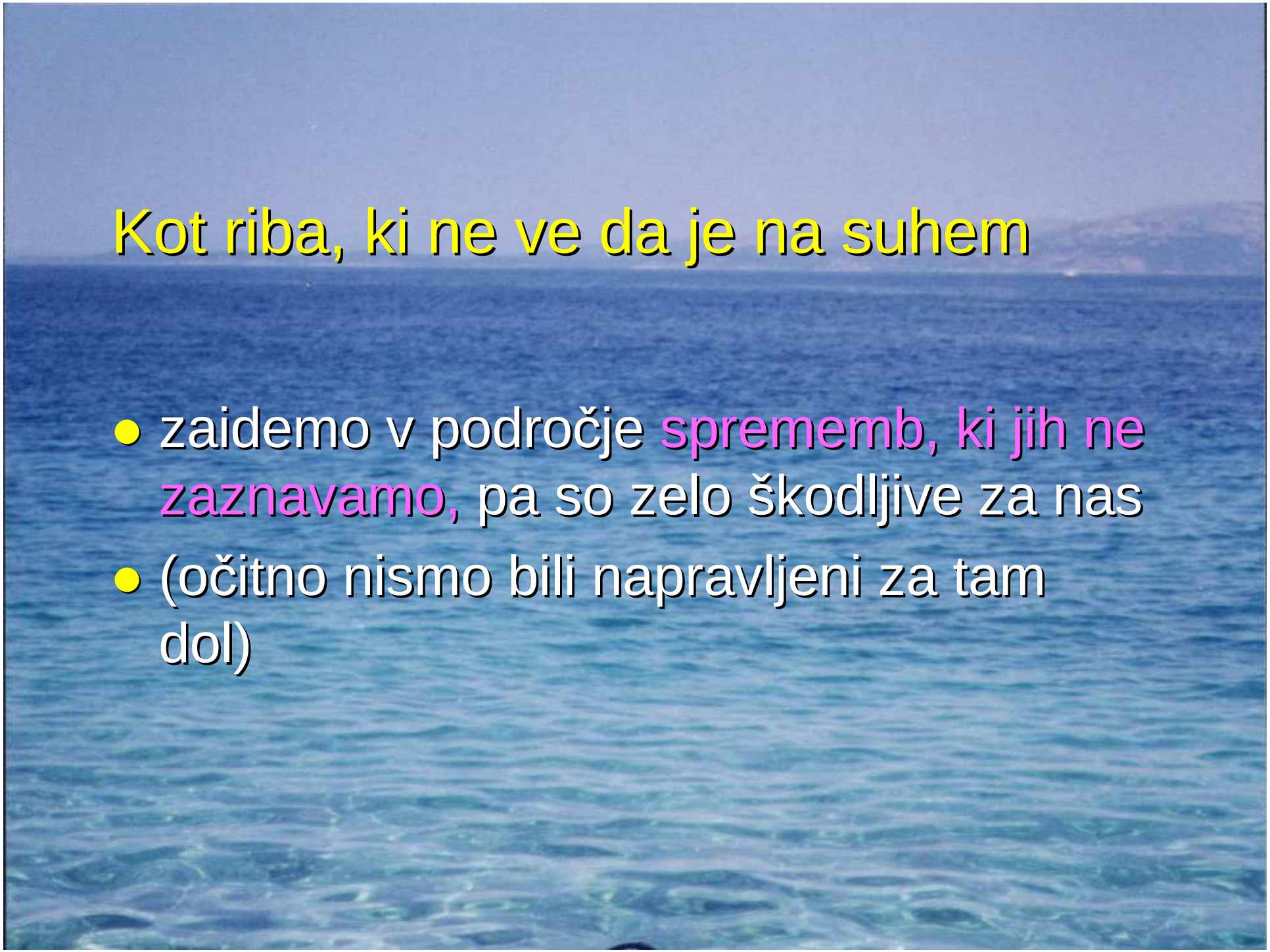
Potapljanje je čudovit šport

- s pomočjo tehničnih sredstev zaobidemo očitne ovire
- zaidemo v področje občutka popolne svobode

Nevarnosti sicer ne manjka







Kot riba, ki ne ve da je na suhem

- zaidemo v področje sprememb, ki jih ne zaznavamo, pa so zelo škodljive za nas
- (očitno nismo bili napravljeni za tam dol)

Tuje okolje obdaja potapljača v celoti

- Temperatura vode (podhladitve)
- Gibanje vode (izčrpanost)
- Tlak = sila / površina

Najpomembnejših sprememb ne zaznavamo

- Parcialni tlak dušika
- Previsok parcialni tlak kisika
- Parcialni tlak CO_2 deloma, nato zataji

Pomembnih sprememb ne zaznavamo

ADVANCED RECREATIONAL DIVING:

ADVANTAGES AND HAZARDS

A. Marroni and D. H Elliott,.

DAN Europe Foundation

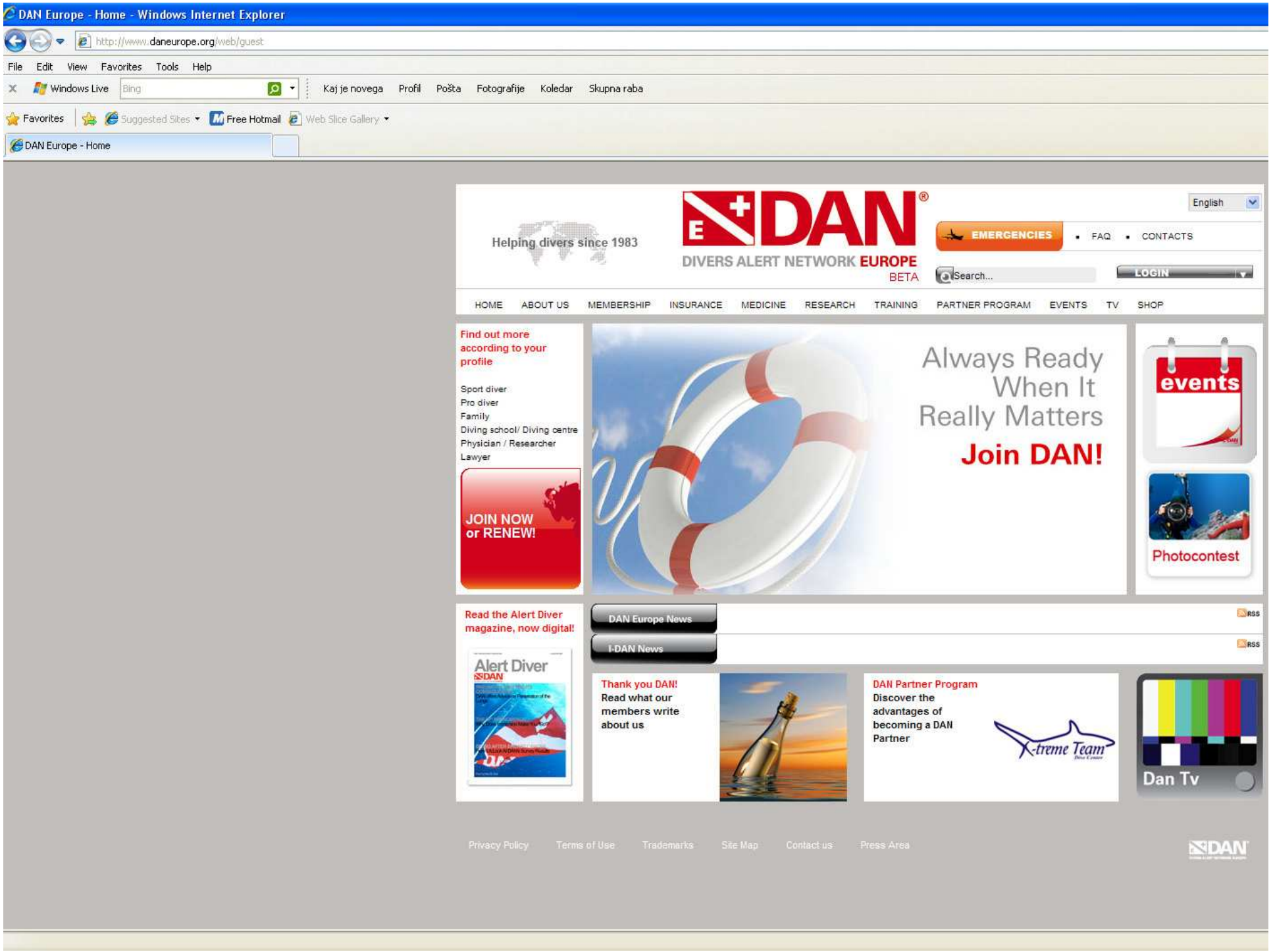
PART I: CURRENT SITUATION IN EUROPE

- Svoje neumnosti (ki pa se jo da izmeriti v metrih)
- ¨Kako globoko se potapljaš?¨ tudi do 156m (pO_2 nad 3 bar)

POGOSTOST POTAPLJAŠKIH NESREČ NARAŠČA

- V ZDA 9.000.000 potapljačev
- V Evropi 1.000.000 potapljačev
- umre 3-9 / 100.000 letno

DeGorordo A, Resuscitation 2003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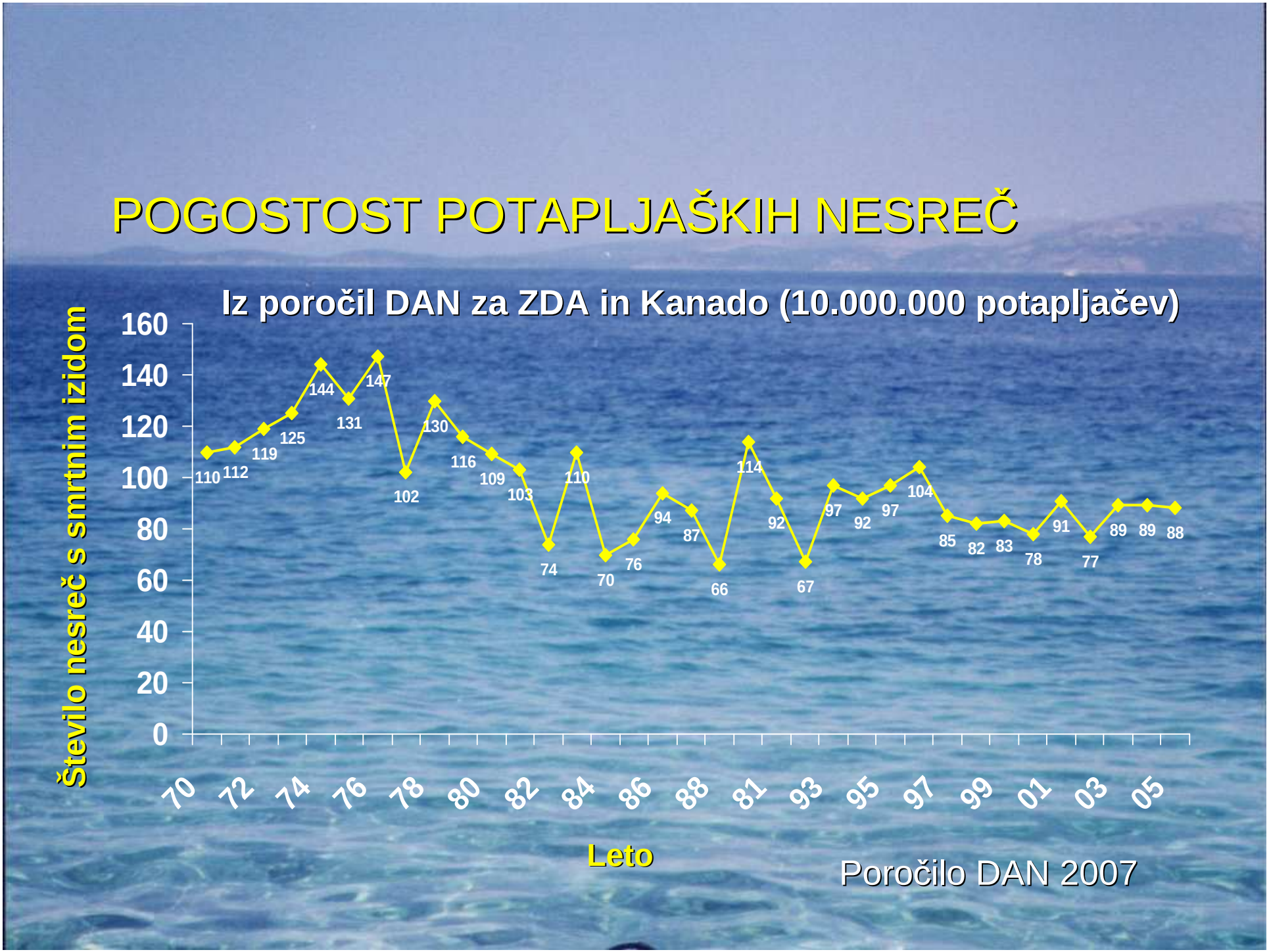
POGOSTOST POTAPLJAŠKIH NESREČ



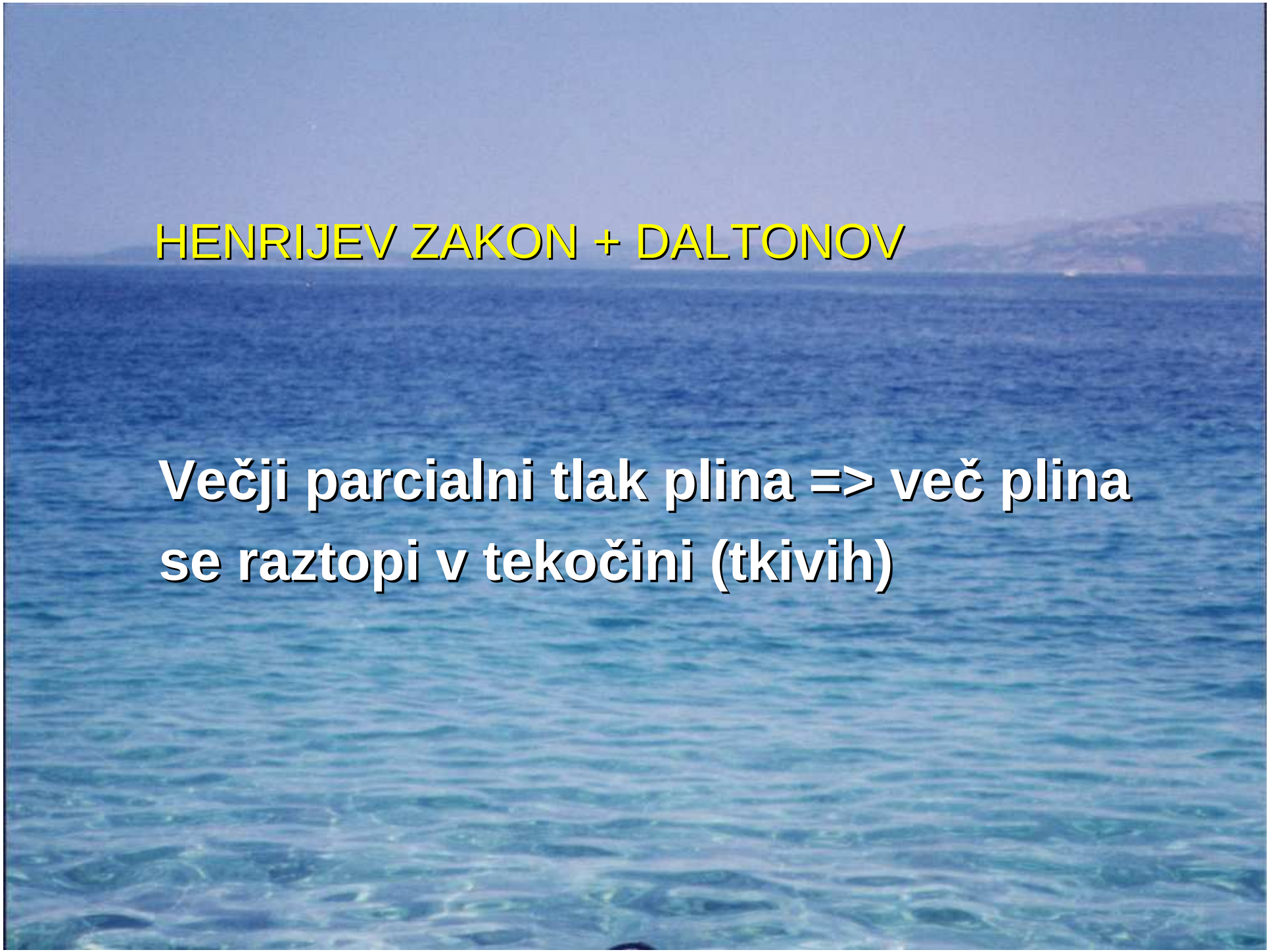
Poročilo DAN 2007

BOYLOV ZAKON

$P_1V_1 = P_2V_2$

nižji tlak = večja prostornina

višji tlak = manjša prostornina



HENRIJEV ZAKON + DALTONOV

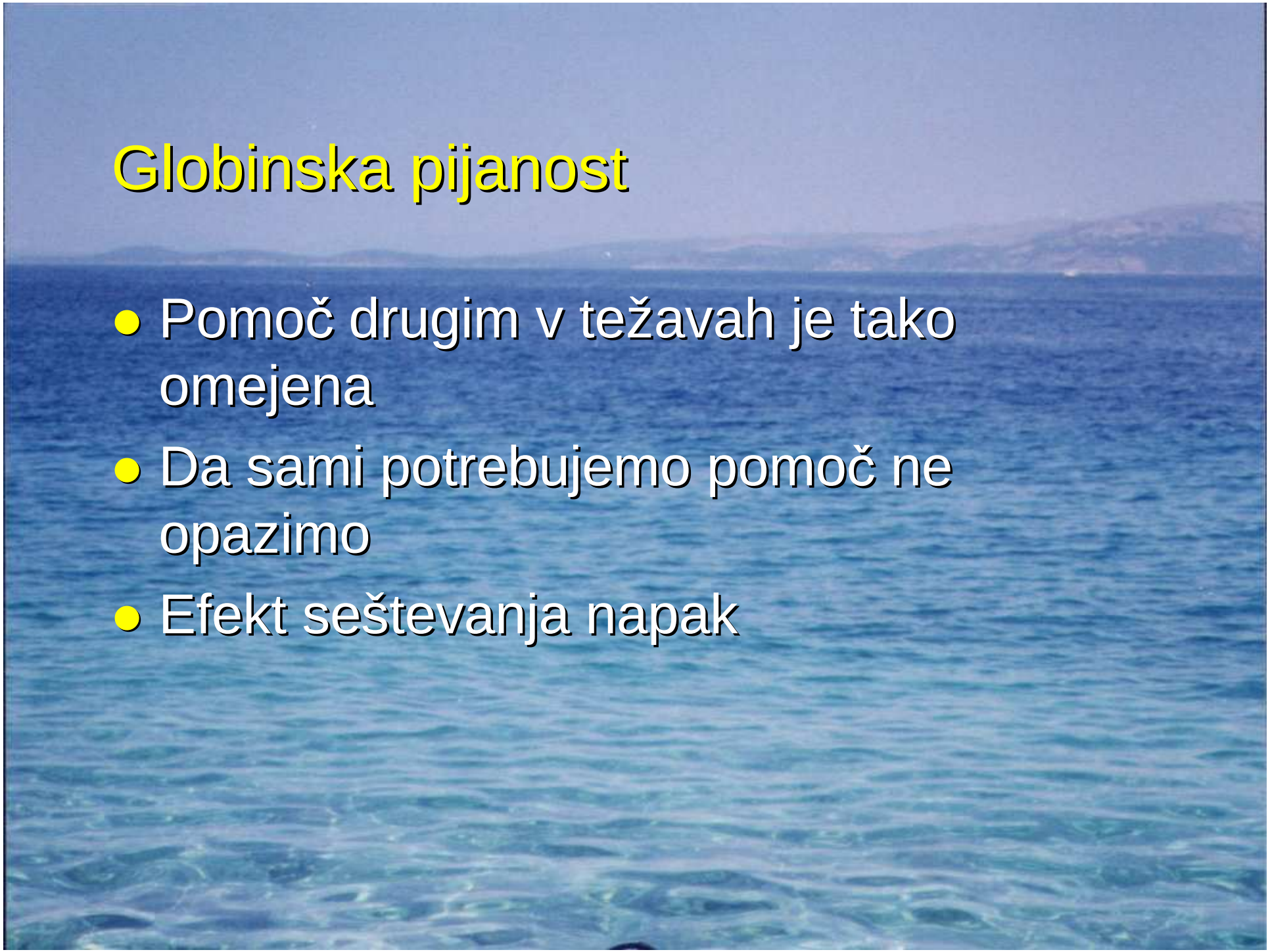
Večji parcialni tlak plina => več plina se raztopi v tekočini (tkivih)

Globinska pijanost (nitrogen narcosis)

- Največ podatkov iz obdobja, ko omejitev ni bilo
- Le redki potapljači lahko opravijo kaj koristnega pri globinah 90m in več
- Reševanje preprostih matematičnih problemov v HB komori je nemogoče po 40m
- Pridruži se še retenca CO_2

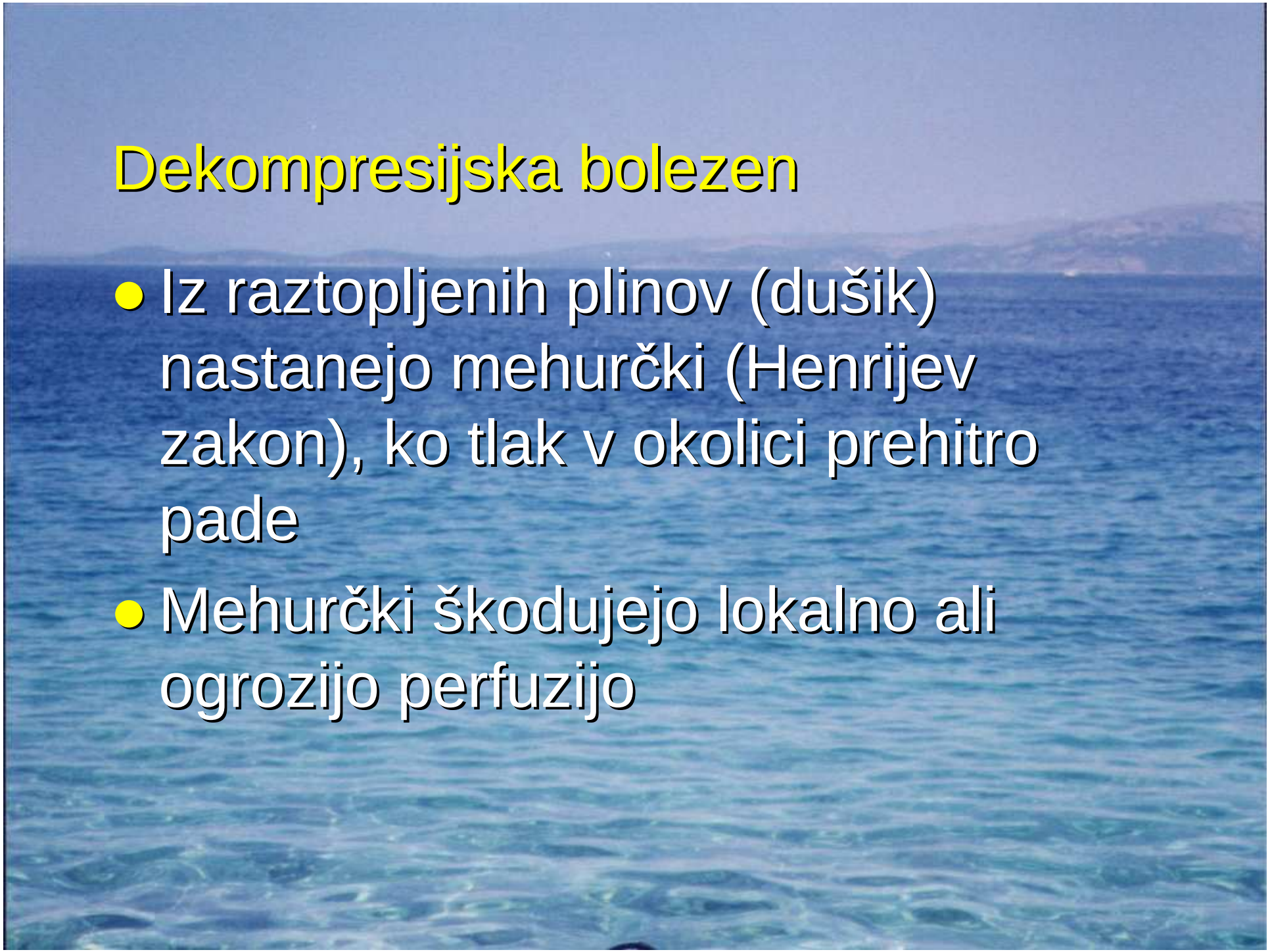
Globinska pijanost – kaj jo potencira

- Mraz
- Stres
- Večji napor
- Zadrževanje CO_2



Globinska pijanost

- Pomoč drugim v težavah je tako omejena
- Da sami potrebujemo pomoč ne opazimo
- Efekt seštevanja napak



Dekompresijska bolezen

- Iz raztopljenih plinov (dušik) nastanejo mehurčki (Henrijev zakon), ko tlak v okolici prehitro pade
- Mehurčki škodujejo lokalno ali ogrozijo perfuzijo

Dekompresijska bolezen

Znaki se pojavijo v 12 urah:

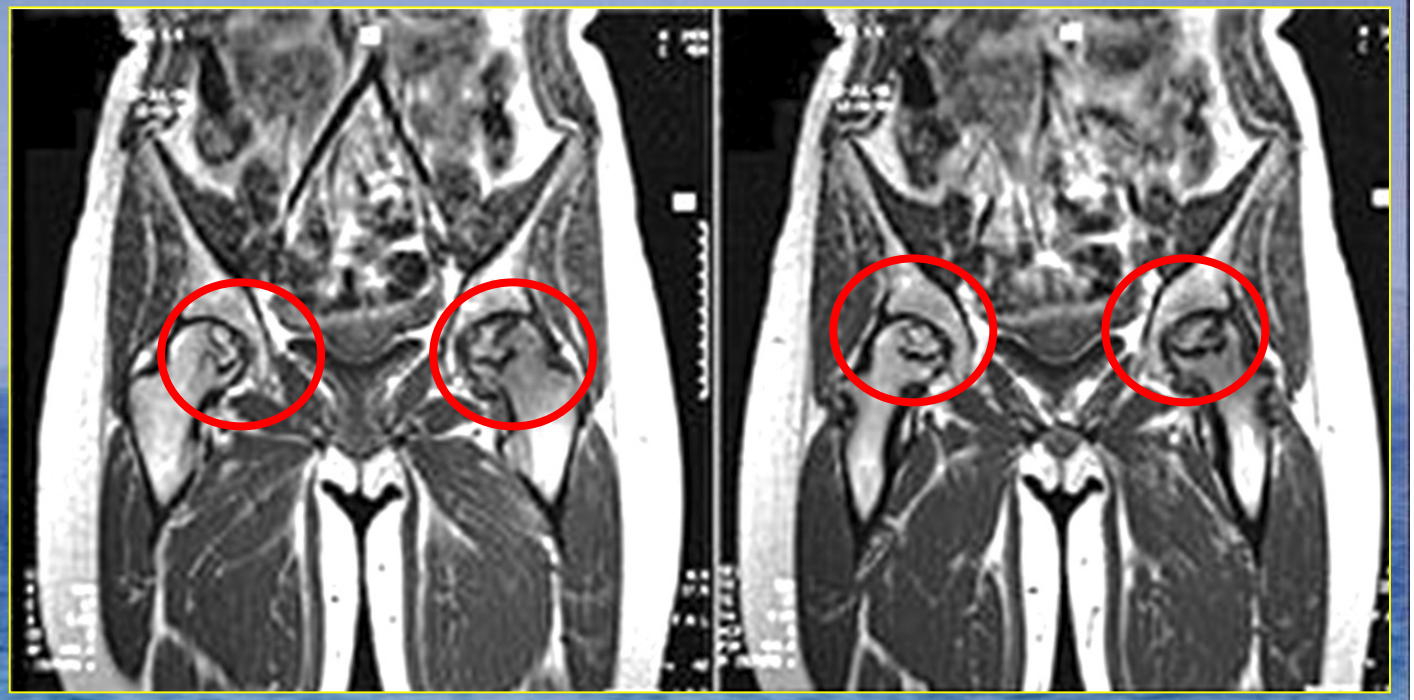
- 80 % v prvi uri
- 95 % v prvih 4 urah

Dekompresijska bolezen

Običajna delitev:

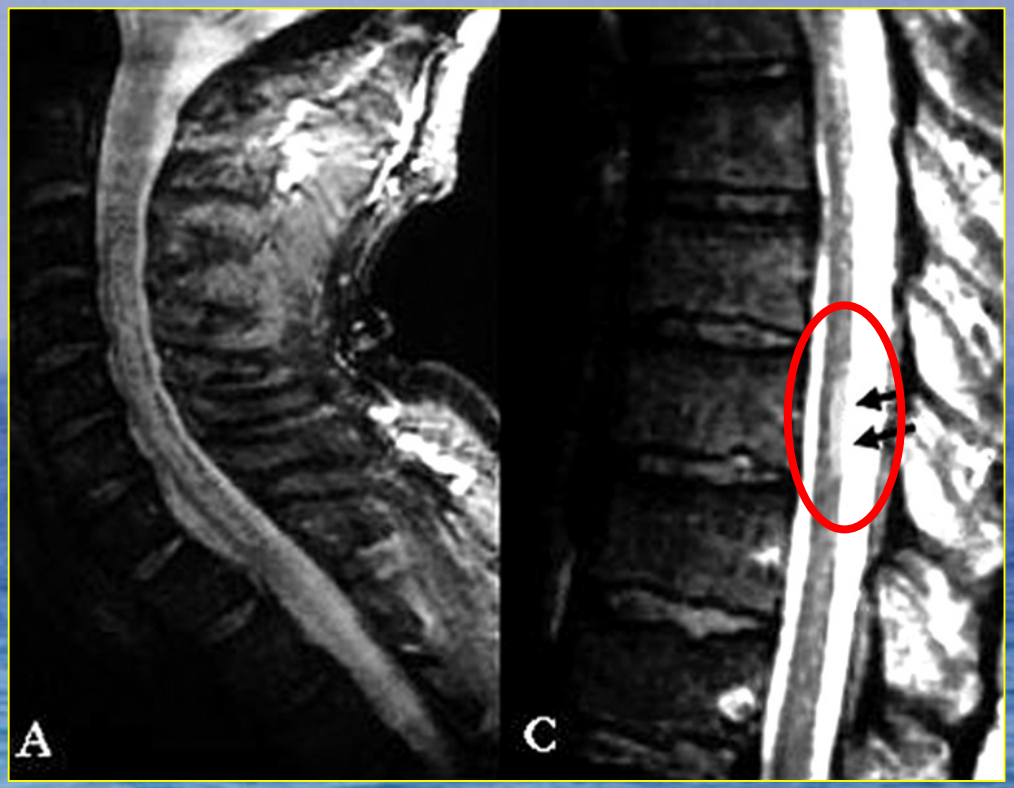
- DB tip 1 - muskuloskeletna
- DB tip 2 - nevrološka

DB tip 1



- Bolečine v okončinah, pritisk bolečino ublaži (bends)
- Roke 3 x pogosteje kot noge
- Lahko preide v DB tip 2

DB tip 2



- Predvsem hrbtenjača
- Težave odvisne od višine prizadetosti hrbtenjače
- Najpogosteje ledveni del hrbtenjače

DB tip 2 - pljučna oblika

- Mehurčki iz venskega sistema zamašijo pljučne arteriole
- Klinična slika kot pri običajni pljučni emboliji – oviran je pretok iz D srca skozi pljuča v L srce (obstruktivni šok, dušenje)

Dekompresijska bolezen zdravljenje

- Rekompresija v hiperbarični komori
- Prva pomoč: kisik, stalen nadzor med prevozom do komore

Pozni nevrološki zapleti potapljanja

258 *British Journal of Industrial Medicine* 1991;48:258–266

Neurological long term consequences of deep diving

K Todnem, H Nyland, H Skeidsvoll, R Svihus, P Rinck, B K Kambestad, T Riise, J A Aarli

Br J Sp Med 1994; **28**(2)

Self-reported long-term effects of diving and decompression illness in recreational SCUBA divers

Dan McQueen BMed Sci, Gerry Kent PhD and Andrew Murrison MB ChB
Department of Psychiatry, University of Sheffield, Sheffield, UK

Pozni nevrološki zapleti potapljanja

Pozni nevrološki zapleti potapljanja

zlasti ko smo že imeli DB!

The divers reported significantly more symptoms from the nervous system than the controls. Concentration difficulties and paraesthesia were the most prominent symptoms. The divers are more informed of neurological symptoms because of their education and training. The symptoms were, however, strongly correlated with DCS 2, saturation diving, deep

Table 1. Percentage of divers in the two groups reporting specific health symptoms

Symptom	*Accident group*	*Control group*	*Significance**
Eyesight deterioration	40	50	n.s.
Double vision	5	6	n.s.
Hearing deterioration	32	20	n.s.
Tinnitus	30	16	n.s.
Vertigo	19	6	n.s.
Headache	46	28	n.s.
Epilepsy	0	0	n.s.
Weakness or clumsiness	19	0	<0.01
Sensitivity to alcohol	27	24	n.s.
Irritability	14	6	n.s.
Difficulty concentrating	46	26	n.s.
Poor appetite	5	6	n.s.
Hot or cold feelings	22	2	<0.001

*Mann–Whitney *U* test; n.s. not significant

Pozni nevrološki zapleti potapljanja

zlasti ko smo že imeli DB!

Neurology. 2000 Dec 12;55(11):1743-5.

Neurologic outcome of controlled compressed-air diving.

Cordes P, Keil R, Bartsch T, Tetzlaff K, Reuter M, Hutzelmann A, Friege L, Meyer T, Bettinghausen E, Deuschl G.

Department of Neurology, Christian-Albrechts University of Kiel, Germany.

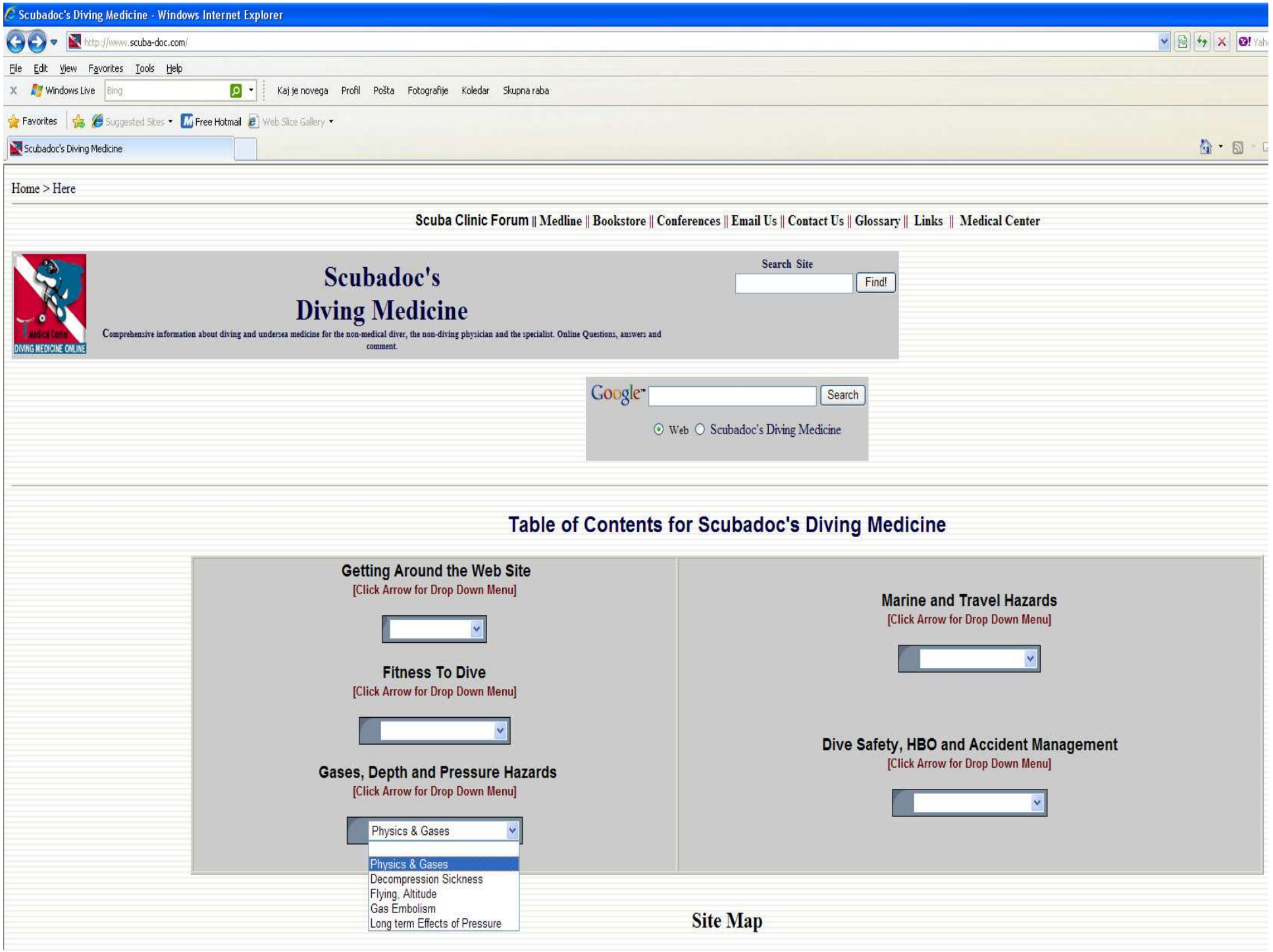
The authors compared the neurologic, neuropsychological, and neuroradiologic status of military compressed-air divers without a history of neurologic decompression illness and controls. No gross differences in the neuropsychometric test results or abnormal neurologic findings were found. There was no correlation between test results, diving experience, and number and size of cerebral MRI lesions. Prevalence of cerebral lesions was not increased in divers. These results suggest that there are no long-term CNS sequelae in military divers if diving is performed under controlled conditions.

Zaključki

- Nesrečam se izognemo z znanjem, telesno pripravljenostjo, nikoli se ne potapljamo blizu meje zmogljivosti
- Težave moramo (ker jih ne zaznavamo) predvideti = poznati klinično sliko, ukrepe, telefonske številke, možnosti transporta


NIKOLI SE NE POTAPLJAJ SAM !


V DVOJE JE VARNEJE IN LEPŠE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